WMB-CP-15   2005

NH Salt Marsh Restoration: Meadow Pond, Hampton NH

Year of Project: 2003/2004
Type of Project: Salt marsh Hydrology Re-establishment & *Phragmites* Control
Primary Project Partners: NHCP, UNH, Town of Hampton
Contractor: Swamp, Inc.
Type of Monitoring: Pre-Restoration

Background:

This area runs from the upland boundaries behind High Street and Gentian Road, to the edge of Meadow Pond Estuary. It is a large, 7-acre stand of common reed (*Phragmites australis*). It is the northern extremity of the largest marsh complex in New Hampshire: the Hampton Seabrook Marsh. The marsh is located landward of a highly developed barrier beach system and obtains tidal flow through a small inlet as its southern terminus. Up until 1995, this inlet was woefully inadequate to support full tidal exchange and was designated by the USDA as severely restricted. The marsh and lagoon system was dominated by cattail and *Phragmites*. In 1995, a new bridge was constructed as large as possible to alleviate the tidal restriction and restore health to the marsh. Small areas of *Phragmites* has been killed and displaced by native vegetation at the southern end of the marsh, near the inlet at Eel Creek. However, the majority of the system remains dominated by *Phragmites*. Furthermore, the *Phragmites* is thriving, with canopy heights ranging from 1.5 to 3 meters.

Meadow Pond Marsh is a back-barrier marsh built on coarse *overwash* deposits that has not responded dramatically to the increase in tide flow. It is not clear why *Phragmites* is maintaining healthy populations at this site, but two important factors include ponding of runoff from the adjacent residential development, and lack of tidal creeks to facilitate salt water movement into the vegetated areas. Perhaps the tides do not bring enough salt into the system, or perhaps underlying course sediments are allowing the *Phragmites* to prosper by keeping sulfides low.

The dense *Phragmites* and illegal dumping, comprised of lawn waste (leaves and grass clippings) from abutting properties and marsh peat and sand from the road, cause the drainage creeks to fill and result in flooding one neighborhood. The tidal flow into the marsh was recently improved by the replacement of large downstream culverts. However, the drainage ways leading from the upland areas are filled with debris and sediment. In addition, there has been a great deal of illegal dumping on the surface of the marsh. One pile of material is at least 6 feet tall. As a result,

freshwater backs up and floods Gentian Road making it impassible during medium to large storm events. Phragmites dominates the marsh. Because of its hollow structure and prolific plant mass, these plants represent an extreme fire risk to the houses in this area. Vegetative sampling conducted by the NH Coastal Program and UNH Jackson Estuarine Laboratory has indicated that the northern portion of this marsh is almost entirely invaded by the non-native Phragmites.

Project Goals:

- Reduce *Phragmites* and other invasive species within the marsh.
- Remove surface sediments to correct elevations on the marsh.
- Create a new tidal creek system and open water habitat such as pools and *pannes*.

Restoration:

This project is challenging because of its size and amount of freshwater in the system. This project improves almost 7 acres of degraded salt marsh by increasing tidal flushing and raising marsh subsurface water elevations through the use of pools and pannes.

A second-tier approach to restoration was developed for 2003. The main hydrologic methods began with the knockdown of standing vegetation and then include: open marsh water management, creek construction, and removal of surface sediments.

Open Marsh Water Management: In this treatment area, ditches were plugged so that they may pond water on the marsh surface and enhance flooding and fish use of the marsh. This method will be compared with the combination of this method and herbicide treatment.

Creek Construction: In this treatment area, creek construction was completed using low-pressure machines and best management practices to create large and medium creeks and a perimeter swale. Several combinations of Phragmites control approaches may yield better results than single approaches, and two will be evaluated within this area.

Removal of Surface Sediments: In this treatment area, twelve small plots were established to assess treatment combinations, but only one will include physical alterations to establish the correct elevations on the sediment surface. Nine of the 12 plots will be planted with bare root seedlings of smooth cordgrass (*Spartina alterniflora*).

The permits for construction were received during the fall of 2003 and project construction began during early winter of 2004. Replanting occurred in early summer of 2005.

The monitoring program begun in summer 2003, with 25 permanent stations established in four experimental areas and one reference area. At the 25 stations, soil salinity was sampled on six dates during summer and fall. Soils were sampled for redox potential, organic matter and sulfides at two depths once in late summer. Vegetation transects were also marked and sampled in summer. Automatic water level recorders were set out in panne and creek sites for one month. Fish (nekton) were assessed in late summer using lift nets in creeks and *pannes*, with five samples of each in the restored area and in the reference area (20 samples total). Currently, the data are being processed for analysis. Funding the Project: Not available at this time.

For more information contact the New Hampshire Coastal Program at (603) 559-1500 or visit **www.des.nh.gov/coastal**.